USER MANUAL
'ECHO' Series
Polypropylene pump

WEL-TECH EQUIPMENTS
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WARRANTY

WEL-TECH Pumps are warranted against defects in material and workmanship under the proper and normal use and services, for a period of one year from the date of original delivery from the factory. WEL-TECH's obligation is limited, however, to furnishing without charge, F.O.B. to factory, new parts to replace any similar of its own manufacture within said period, provided the buyer has given WEL-TECH immediate written notice upon discovery of such defect, NO allowance will be made for labor charges. WEL-TECH shall have the option of requiring the return of the defective material, transportation prepaid, to establish the claim.

WEL-TECH assumes no liability for damages or delays caused by defective material, and no allowance will be made for local repair bills or expenses without the prior written approval or authority of WEL-TECH.

Under no circumstances WEL-TECH will be liable for indirect, special or consequential loss or damage of any kind by the buyer, his employees, or others.-

PERFORMANCE GURANTEE

WEL-TECH gives it at the specified point of rating only and will not cover performance under conditions varying there from not for sustained performance over any period of time.

PERFORMANCE REPRESENTATIONS

Are based on shop laboratory tests corrected for field performance in accordance with the engineering practices outlined.

ALL WARRANTIES

Are void if :-

- Pipe strains are the cause of damage.
- Pump handles liquids other than those specified in datasheet.
- NPSH lower than required by pump impeller.
- Operating speed is higher than specified.
- Improper field installation.
- Wrong rotation.
- Dry running of the pump.
- Liquid temp. too high

RECOMMANDETION FOR SPECIAL MATERIALS

To combat corrosion, abrasion, erosion, or pumping solids, foreign objects, or pumping liquids at elevated temperatures, any such recommendations will be based on the best available experience of WEL-TECH and the supplier of the material and industry, BUT WILL NOT CONSTITUTE A GURANTEE AGAINST THESE EFFECTS. ALL SEALING ELEMENTS (MECHANICAL SEAL, OIL SEAL etc…..) ARE EXCLUDED FROM THE WARANTEE.

All illustrations and provisions in specifications are descriptive and are not intended as warranties. Penalty clauses of any kind are not acceptable unless approved in writing by an officer of WEL-TECH.

INSTALLATION OF HORIZONTAL PUMPS

Location:-

It should be placed as close as to the source of fluid supply to ensure a positive flooded suction. Always allow sufficient head room and floor space for proper inspection and maintenance.

Foundation:-

The foundation of the pump should be level, and of a construction which will support the total pump and motor. The foundation should absorb any vibration and from a permanent support for the pump base.

Bolts should be embedded in the foundation and should be of sufficient length to allow for the addition of shims for leveling the pump.

After the pump is mounted on the foundation and shims are inserted, the nuts should be pulled down evenly. Check level again after tightening nuts to assure proper alignment of the pump and motor.

Alignment:-

Alignment of the pump and driver through the flexible coupling is of extreme importance for trouble free mechanical operation. If the driver was mounted at the factory, the unit was aligned prior to shipment. However, in transit and subsequent handling, this factory alignment was possibly disturbed, and it is recommended the alignment to be checked.

The following steps are suggested to establish the initial alignment of the pump unit.

- Be sure the foundation bolts are tight.
- Be sure the casing and frame feet are tight.
- Use shims under the driver feet to establish parallel alignment of pump and motor shafts.

PIPING THE PUMP

Piping must be connected to the pump until base, pump and driver are in complete alignment.

The pump has been designed with all necessary strength factors for long, reliable service life. However, due to the non-metallic construction, care must be taken during installation to avoid unnecessary pipe strain. If severe piping strains are to be encountered, flexible connections are recommended on suction and discharge flanges.

When Teflon or similar lined piping is used, flange alignment should be carefully checked. Spacer ring gaskets are recommended to assure parallel alignment of pipe and pump flanges.

All piping must be supported independently of the pump. The piping should always line up naturally with the pump flanges. Never draw the piping to the suction or discharge flanges of the pump. Outside installation should be properly compensated for changes in ambient temperatures. Refer to pipe manufacturer standards for proper installation. Omission of this could result in severe strain transmitted to the pump flanges.

The piping should be as short and direct as possible. Avoid all unnecessary elbows, bends and fittings, as they increase friction losses in the piping.

SUCTION PIPING

- The length of the suction pipe (from process to pump inlet) should be as short as possible.
- The diameter of the suction pipe should be as large or larger than the pump suction.
- Expanders, or reducers, if used, should be eccentric and installed at the pump suction flange with eccentric side on the bottom of pipe.
- Elbows or fittings should be avoided at suction flange. Allow at least 10 pipe diameters in length for straight run into pipe.
- If a valve is to be installed in the suction piping, only full flow valves should be used (gate, ball, plug types). These valves should be shutoff only, not for throttling or controlling flow.

DISCHARGE PIPING

A valve in the discharge line can be used as a block valve for inspection and maintenance. It should be of a design to allow throttling or flow control.

Use non-return valve in discharge line to avoid liquid flowing back into the pump casing from discharge line. This will cause wrong rotation of impeller and it might get loosen onto the shaft.

CENTRIFUGAL PUMPS SHOULD NEVER BE THROTTLED ON THE SUCTION SIDE.

The Pump shaft should turn freely by hand after the piping has been connected to the pump. This is to ensure that the piping not caused binding in the pump. If binding occurs , check alignment and realign if necessary.

GENERAL OPERATING PROCEDURES HORIZONTAL PUMPS

All pumps are clockwise rotation when viewed from the coupling end. This is marked by an arrow on the pump frame. Turn shaft by hand to be sure rotating element is free. If rubs or binds:

- Check alignment.
- Check for piping strains on casing flanges, or other loads on casing.
- Check impeller clearance. (see impeller adjustment)

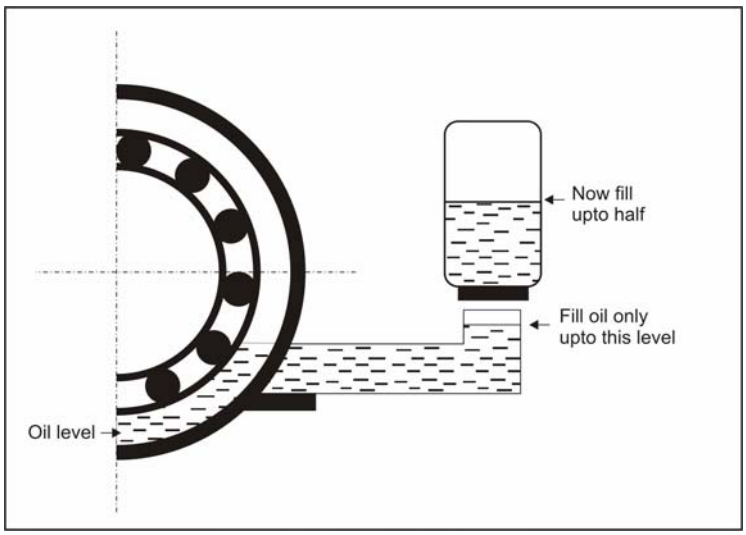
Jog motor to check rotation. If operating is in wrong direction, reverse leads.

PREPARATION FOR OPERATION.

Pump bearings are grease or oil lubricated. The bearing frame housing is not lubricated at the factory. Lubricant must be added to frame prior to pump start-up.

A high quality turbine type non-detergent oil, with rust and oxidation inhibitors should be used. For the majority of operating conditions, the oil temperature should run at 50’C above the room temperature.

Fill reservoir with oil, place thumb over reservoir spout, invert and screw reservoir into upper casting. Allow reservoir to empty, filling the housing. Depending on the size and capacity of the bearing chamber, several fillings of the reservoir may be required before the actual oil level is reached. When oil is reached, no more oil will run out of the reservoir bottle. Start up pump and check to see that the proper oil level is being maintained.



PUMPS WITH MECHANICAL SEALS

Do not operate the pump without cooling the mechanical seal. The water to the seal may be piped from external clean source. The installer must provide external clean water to the seal. This applies regardless of the type of seal. Proper flow for external cooling flushing will vary from 2 to 3 liters per minute at 0.5 kg/cm^2 pressure.

SINGLE OUTSIDE MOUNTED SEAL

The type of seal requires only cooling line for the intake of flush liquid. The seal has been adjusted for the proper setting when the pump was assembled. If readjustment becomes necessary, refer to the seal manufacturer's instruction for proper setting.

DOUBLE INSIDE MOUNTED SEAL

Requires two flush lines, one for the intake of the flush fluid, and one for the exit. Most double seals are self adjusting and do not require setting. Refer to the seal manufacturer's instructions for any special installation features, for proper piping arrangement, and specific flow requirements.

PUMPS WITH PACKED STUFFING BOX

When the pump is provided with a packed stuffing box, one flush line is required for intake of liquid. The packing gland must be adjusted at start up of the pump for the proper operation. When the pump is put into operation, the gland should be considerably loose. After the pump is operating, the gland should be slowly tightened to reduce the amount of leakage.

A slight flow of liquid from the stuffing box is necessary to provide lubrication and cooling.

INTERNAL MECHANICAL SEAL

A bellows made of rubber, hypalon or neoprene presses a stationary seal ring by elastic pretension helped by the pressure produced by the pump against the rotating seal ring. Pumps handling dirty liquids are provided with a flushing liquid connection to flush the mechanical seal with clean liquid and protect it from impurities. To limit the flow rate of the flushing liquid the shaft sealing space is additionally sealed with a throttling element (non-contact seal) against the inner part of the pump. fig. shows a WEL-TECH single bellows type mechanical seal which is flushed and cooled from outside by clean flushing which enters pumped liquid.

Depending on pump size and impurity of the pumped liquid the flushing rate is between 70 and 400 I/h at pressures of between 0.5 and 2 bar. Pressures and flushing rate will be specified. To set the correct flushing rate we recommend that flow-meter be built into the flushing liquid pipe. The pressure is best monitored by a manometer. A control valve is to be used for regulating the flow rate. If the pressure produced by the flushing liquid is too high a pressure reducing valve has to be added.

PRIMING

Suction valve must be fully open. The pump casing and suction piping must always be full of liquid before the pump is started. Centerline discharge designs are self-venting.

Check to be sure flush water is flowing to seals (if external flush), so that seals will not be operating on dry surfaces.

STARTING

Start pump with discharge valve shut or slightly opened.

Bring the pump up to speed and immediately open discharge valve to rated the flow. DO NOT RUN PUMP FOR A ONG TIME WITH A CLOSED DISCHARGE VALVE as it may overheat causing pump damage.

Check flush water to mechanical seal.

Check oil levels in the bearing frame and lubricator on ECHO series models.

OPERATIONAL CHECK LIST

- Periodically check stuffing box for leakage with packing and mechanical seals.
- Periodically check oil lubrication to the pump and driver bearings.
- Periodically check for excessive vibrations and oil temperatures. Correct if necessary.
- Periodically check O-ring between impeller and shaft threads.
- Periodically check oil seals for leakage.

TROUBLE CHECK LIST

NOT ENOUGH OR NO LIQUID DELIVERED:

- Suction pipe and/or pump casing not filled with liquid.
- Speed too low. (result, reduced TDH)
- Suction lift too high or insufficient NPSHA (Cavitations)
- Impeller or suction pipe clogged with solids.
- Wrong rotation. (result, reduced TDH)
- Suction line too small than specified.
- Air pocket in suction line or leakage through packing box area.
- Suction strainer clogged, if used in suction line.

NOT ENOUGH PRESSURE:

- Speed too low.
- Air or gases in the liquid.
- Check impeller diameter.
- Mechanical defects (impeller clearance too great, impeller damaged).
- Wrong rotation.
- Pressure gauge in the wrong place.

PUMP RUNS BUT INTERMITTENTLY PUMPS LIQUID:

- Suction line leakage.
- Leakage of air in stuffing box.
- Air pocket in suction line.

- Insufficient NPSH.
- Air or gases in liquid.
- Liquid at higher temperature.

PUMP TAKES TOO MUCH POWER:

- Speed too high.
- Head lower than rating; pumping beyond design point.
- Liquid heavier than specified; check viscosity and specific gravity.
- Mechanical defects (bent shaft, rotating element binds, packing too tight, misalignment.)

PUMP IS NOISY:

- Hydraulic noises – cavitations; insufficient NPAHA
- Mechanical defects (shaft bent, rotating parts are binding, loose or broken)
- Pump and drive are misaligned.

IMPELLER ADJUSTMENT

The horizontal series design permits adjustments of the impeller clearance between the pump casing wall and the impeller face. The pump impeller is adjusted at the factory during assembly and should not required further adjustment upon installation.

Impeller adjustment will be required when drop in head and/or capacity indicates a change in clearance or when impeller is replaced. Refer to the following table for recommended clearance when adjusting impeller on horizontal pumps.

IMPELLER	FRONT CLEARENCE	BACK CLEARENCE
ECHO – 100	1 mm	3mm
ECHO – 130	1 mm	3mm
ECHO – 150	1 mm	3mm
ECHO – 160	1 mm	3mm
ECHO – 40	1 mm	3mm
ECHO – 50	1 mm	3mm
ECHO – 55	1 mm	3mm

- Loosen set screws or other holding devices if so provided on mechanical seals before adjusting impeller to prevent seal face damage.
- Loosen four adjusting screws evenly of bearing cover.
- Tighten up equally on the outer screw until you can feel impeller just starting to rub on the casing face. By rotating the shaft frequently by hand while tightening the screws, you can determine when the impeller begins to bind.

- Loosen the outer screw evenly until you can insert a feeler gauge under each of the four bolt heads to the recommended clearance.
- Tighten adjusting screws evenly until the bearing housing is backed up against the outer screws.
- Check to be sure the shaft turns freely.
- Reset and tighten the mechanical seal as per the seal manufacturer's instructions.

DISASSAMBLY

Refer to applicable sectional drawing in the manual. The following procedure and precautions should be taken.

1. Before disassembly, the electric motor should be either disconnected from its power sources, or the switch or circuit breaker must be secured in an 'off' position so that the motor cannot be accidentally started.

2. Depending upon the fluid being pumped, the proper protective equipment should be worn (gloves, mask, respirator, goggles, or safety glasses, etc.) to prevent contact with the fluid in the pump or pipelines.
3. Check the valves in the suction and discharge lines to be sure they are closed and secured.
4. If the piping is provided with drain, the fluid trapped in the pump and piping to either trap the fluid in a container or to divert it to a proper disposal area so that the area around the pump and base will not be contaminated.
5. If the mechanical seal is flushed from an external source, turn off the valve in the supply line and disconnect flush line.
6. Remove coupling guard.
7. If a spacer type coupling is used, refer to the coupling instruction in this manual for proper disconnection of the coupling. If another type coupling has been used, refer to the manufacturer's data.
8. If the complete pump is to be removed to a maintenance area, Disconnect the suction and discharge piping, taking care that liquid in the line, if the pump has been drained, does not suddenly spill out. Otherwise, leave the casing and the flange connection in place.
9. Remove bolts holding bearing block to base. The remaining instructions apply whether the complete pump is taken to a maintenance area or whether the pump casing is left connected to the piping.
10. Loosen set screws on the mechanical seal, if the seal is the outside type.
11. Remove the cage ring bolts, nuts and washers holding bearing block and the pump casing.
12. Pull the bearing block and impeller assembly away from the pump casing.
13. The impeller assembly can now be removed by fixing the pump shaft at the coupling end and turning the impeller in a counter clockwise direction facing the impeller. A strap wrench or similar device may be required to disengage

the screw threads. The impeller, back plate and seal can now be removed as a unit.

14. Pull the rotary seal assembly off, using a twisting motion. The stationary ring may now be removed from the stuffing box cover.
15. EXTERNAL MECHANICAL SEAL:

For mechanical seal stationary ceramic can be removed be removing 4 nuts from locating flange. Keep ceramic stationary and Teflon rotary parts carefully to avoid any damage.

For internal mechanical seal remove impeller, 'O' ring between impeller and rotating ring. Then remove back plate from bellow holder, rubber bellows, along with stationary. Loosen bolts of stuffing box to remove stationary ring of mechanical seal.

For gland pack, remove impeller take out back plate from the bearing housing inspect gland rings and gland pusher. If required change the gland packing. Drain out oil from the bearing block.

BEARING BLOCK DISASSEMBLY

1. Remove the shaft 'O' ring. Keep it carefully so that during assembly it should be refixed.
2. Drain out the oil from the bearing frame.
3. FRB sleeve is one piece with shaft. Hastelloy Alloy-20, S S are tight fit on shaft.
4. If ceramic sleeve, remove the sleeve carefully from shaft.
5. Take out 6 bolts from bearing cover. Now take out shaft with bearing cover by hitting shaft end with wooden pallet.
6. Take out coupling from the shaft.
7. Take out circlip from bearing cover so that shaft with bearings is free from bearing cover.
8. Check the bearing. If found OK clean them with kerosene or safe solvents. Reassemble the bearing frame in the reverse order.

ASSEMBLY OF PUMP END

1. Install the impeller and seal assembly on to the bearing power frame; making sure the impeller threads are firmly bottomed on the shaft threads. With the ring make sure there is no relative motion between the impeller and the shaft. Install the casing and set the axial impeller adjustment to the specified value with the pump assembled and adjusted. The rotating assembly spring gap can now be set. The spring gap dimension is stamped on the seal collar. Tighten the set screws and make sure the spring gap is equally spaced.
2. During reassembly change the oil seals and shaft 'O' ring.
3. Insert mechanical seal rotary part on the shaft with help of oil or grease.

OPERATIONAL RECOMMENDATIONS

- Never start up the equipment without properly venting the pump of air, recommend that there should be circulation through the stuffing box whenever the equipment is in operation, especially when the product has a high vapour pressure.
- If the seal runs hot, check for proper seal setting, seal housing dimensions, and check the by-pass line for obstructions. Do not allow the equipment to run for an extended time if the seal gets hot or sequels.

CAUTION

The following practices may be hazardous to personnel or result in damage to the equipment. Please note these warnings before operating the equipment.

- **DON'T** operate pump without coupling guard.
- **CHECK** electrical connections to ensure tightness to connections, all covers and seals must be secure, proper size wire and switchgear must be used.
- **DON'T** operate pump with suction or discharge valve closed.
- **DON'T** place undue stress on pipe or flanges and fittings.
- **DON'T** operate motor until securely fastened to base.
- **DON'T** operate pump with incorrect rotation.
- **DON'T** subject pump to pressures beyond published ratings.
- **DON'T** operate pump without lubrication to bearing.
- **DON'T** run the pump dry.

ALIGNMENT OF THE COUPLING

The shafts of the pump and motor might be at an angle or at different heights. Therefore, the following checks are to be carried out.

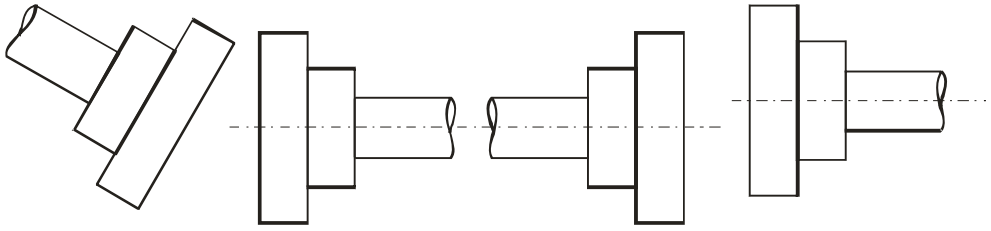
CHECKING THE ANGULAR ALIGNMENT OF THE SHAFTS:

Measure with calipers the total width between the two coupling halves at four points on the circumference (top, bottom and two sides; the shaft should not be turned). The readings should be the same for proper angular alignment.

CHECKING THE PARALLEL ALIGNMENT OF THE SHAFTS:

A check for parallel alignment is made by placing a straight edge across both coupling rims at the top, bottom and at both sides. The unit will be in parallel alignment when the straight edge rests evenly on the coupling rim at all positions. Care must be taken to have the straight edge parallel to the axis of the shaft. (The shaft shall not be turned during this check.)

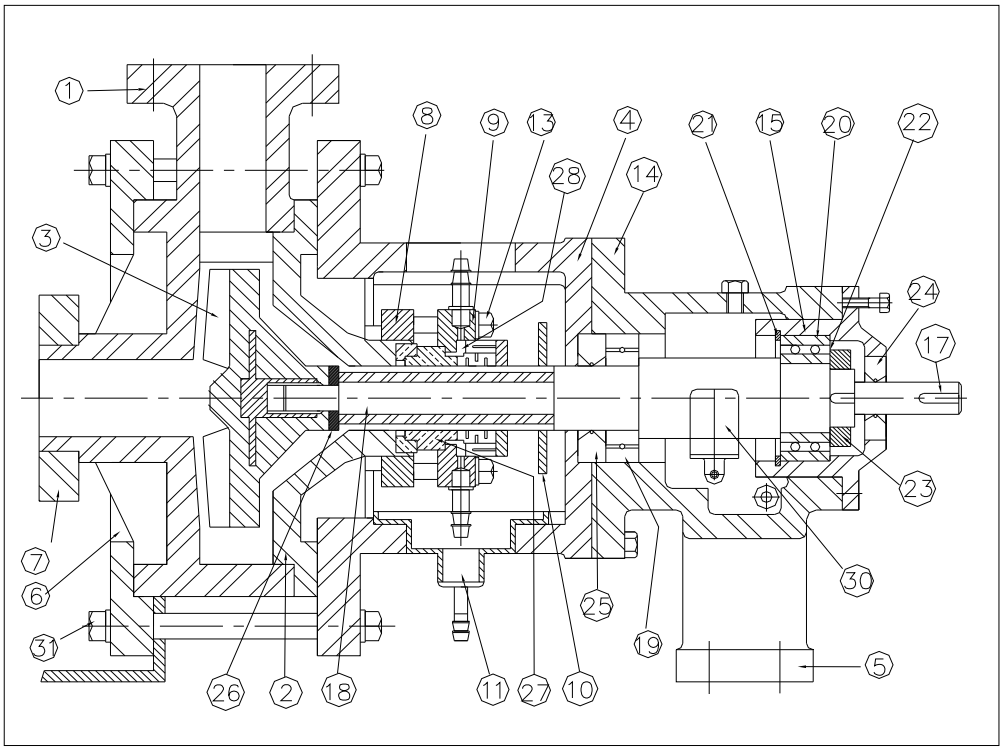
When the alignment is correct, the foundation bolts should be tightened evenly but not too firmly. The alignment is to be checked again. The permissible error should not exceed 0.05mm.



Angular misalignment

Difference in height of the axis

PUMP PART LIST



ECHO SERIES

SR NO	PART NAME	MATERIAL	QTY.
1	VOLUTE CASING	POLY PROPELENE	1
2	BACK PLATE	POLY PROPELENE	1
3	IMPELLER	POLY PROPELENE	1
4	ADOPTER	CAST IRON	1
5	LEG FOR B.B	CAST IRON	1
6	CAGE RING	CAST IRON	1
7	SUCTION FLANGE/REDUCER 40X40	POLY PROPELENE	1
8	ADOPTER FLANGE	POLY PROPELENE	1
9	LOCATING FLANGE	HYLAM	1
10	DEFLACTOR	POLY PROPELENE	1
11	DRIP TRAY	PLOY PROPELENE	1
13	BOLTS FOR CLAMP	PP+STEEL	4
14	BEARING HOUSING	CAST IRON	1
15	BEARING COVER	CAST IRON	1
17	BARE SHAFT	EN-8/SS	1
18	SHAFT SLEEVE	CERAMIC	1
19	BEARING (INB)	STD.	1
20	BEARING (OB)	STD.	1
21	CIRCLIP	STD.	1
22	STAR WASHER	STEEL	1
23	LOCK NUT	STEEL	1
24	OIL SEAL (OB)	NEOPRENE	1
25	OIL SEAL (INB)	NEOPRENE	1
26	"O" RING	NEOPRENE	1
27	STATIONERY RING ASSLY.FOR MECH.SEAL	CERAMIC	1
28	ROTARY UNIT ASSEMBLY FOR MECH. SEAL	PTFE BELLOWS	1
30	CONSTANT LEVEL OILER	STD	1
31	CAGE RING HARDWARE	HARDWARE	1